AMENDMENTS TO THE SPECIFICATION

Please replace paragraph [0007] with the following amended paragraph:

[0007] In order to maximize the film effectiveness, the amount of cooling flow directed onto the airfoil outer surface is preferably maximized. Thus, the amount of cooling flow passing through, and thus the cross-sectional area of, the film cooling holes extending through the airfoil sidewall, is also preferably maximized. Moreover, it is preferable that the ratio of the length to diameter of each of the film cooling holes extending through the airfoil sidewall be greater than two. If the length-to-diameter ratio is greater than two, then the cooling flow will exit the film cooling holes fairly close to the upstream sidewall outer surface, which will further maximize film effectiveness. However, the thickness of the airfoil sidewall is, in many cases, small enough that other design constraints, such as the minimum distance between film cooling holes, cannot be met if these other constraints are met. Moreover, while a small relative hole angle is generally advantageous, as the hole angles relative to the airfoil surface are reduced, the inlets of the holes in a single coolant channel can interfere with one another, thereby reducing film effectiveness.

Please replace paragraph [0010] with the following amended paragraph:

[0010] In one embodiment, and by way of example only, a turbine blade for a gas turbine includes an airfoil, a plurality of internal cooling channels, and a plurality of film cooling holes. The airfoil has at least an outer surface, a bottom edge, and a top edge. The plurality of internal cooling channels is formed in the airfoil. The plurality of film cooling holes extend through the airfoil and are in fluid communication with one of the internal cooling channels. The plurality of film cooling holes are arranged into at least two adjacent rows that are disposed on at least a portion of a line that extends between the airfoil top and bottom edges. Each film cooling hole has a centerline extending therethrough. The centerline of each film cooling hole forms a compound angle with respect to a tangent of the airfoil outer surface, and a distance between the centerlines of each film cooling hole is at least a predetermined minimum distance.

Please replace paragraph [0027] with the following amended paragraph:

[0027] Turning now to FIGS. 3 and 4, it is seen that a plurality of internal cooling channels 302 are formed in the airfoil 206, between the upstream 208 and downstream 210 sidewalls. In the depicted embodiment, four internal cooling channels 302a-d are formed in the airfoil 206, though it will be appreciated that in alternative embodiments more or less than this number of cooling channels 302 could be included. The cooling channels 302a-d extend through the airfoil platform 204 and turbine mount section 202 (not shown in FIG. 3) to <u>one or more</u> individual cooling channel inlet ports 402a-d formed in a bottom surface 404 of the turbine mount section 202 (see FIG. 4). As was previously mentioned, a flow of cooling air supplied from the engine compressor section 104 is directed into each of the internal cooling channels 302a-d, via the cooling channel inlet ports 402a-d. The cooling air is circulated through the internal cooling channels 402a-d, and removes heat from the airfoil 206 via convective heat transfer.

Please replace paragraph [0030] with the following amended paragraph:

[0030] The compound injection angles of the film cooling holes 230 are each formed with respect to a predetermined airfoil datum structure. In the depicted embodiment, the airfoil datum structure includes two datum planes. More specifically, and with reference to FIG. 5, the airfoil datum structure includes a first datum plane 502 and a second datum plane 504. Although the first 502 and second 504 datum planes are depicted as intersecting lines, it will be appreciated that, from the perspective of FIG. 5, the first datum plane ~~502extends~~ <u>502 extends</u> into and out of the page, and the second datum plane 504 is in the plane of the page. It will additionally be appreciated that the depicted datum structure is merely exemplary of any one of numerous arbitrary datum structures, and that various other datum structures could be used. Nonetheless, in the depicted embodiment, the compound injection angle of each film cooling hole 230 is a combination of a first angle that is formed with respect to the first datum plane 502 and a second angle that is formed with respect to the second datum plane 504. Moreover, as

will now be explained in further detail, the location of the centerline of each film cooling hole 230 is also defined relative to the first 502 and second 504 datum planes.

Please replace paragraph [0031] with the following amended paragraph:

[0031] With reference now to FIGS. 6 and 7, which each illustrate a single film cooling hole 230 in the first row 232a, it is seen that the location of each hole centerline 602 and the compound injection angle of each hole centerline ~~601~~ 602 are defined by at least a first angle (α_1) relative to the first datum plane 502, a first displacement (d_1), a second angle (α_2), relative to the second datum plane 504, and a second displacement (d_2). As shown in FIG. 6, the first displacement is measured relative to a first locater plane 604 that is rotated about a fixed point 606 such that it makes the first angle (α_1) relative to the first datum plane 502, and is in a direction (either "+" or "-") that is perpendicular to the first locater plane 604. Similarly, as shown in FIG. 7, the second displacement is measured relative to a second locater plane 702 that is rotated about a fixed point 704 such that it makes the second angle ~~702~~ (α_2) relative to the second datum plane 504, and is in a direction (either "+" or "-") that is perpendicular to the second locater plane 702. Thus, the hole 230 is located, and makes an angle, relative to the first datum plane 502, where the first locater plane 604 intersects the airfoil upstream sidewall 208, and is also located, and makes an angle, relative to the second datum plane 504, where the second locater plane 702 also intersects the airfoil upstream sidewall 208.

Please replace paragraph [0032] with the following amended paragraph:

[0032] The above-described method of forming and locating the film cooling holes in the airfoil of a turbine engine blade minimizes the distance between the individual film cooling holes in adjacent rows of cooling holes, while still maintaining a predetermined minimum distance between each hole at all locations along the length of each row of film cooling holes. Moreover, the compound angle between the hole centerlines and a tangent to the airfoil upstream sidewall outer surface is also minimized. In a particular preferred embodiment, the predetermined minimum distance between each hole is between about two and about four times a hold diameter, and the compound angle between the hole

centerlines and tangent to the surface is between about 15-degrees and about 30-degrees, and is preferably less than about 20-degrees. Hence, the film effectiveness is maximized. As a result, a particular gas turbine engine that included airfoils manufactured as described herein, was able to operate at turbine gas temperatures approximately 100°F higher than a turbine engine using conventionally manufactured airfoils, which translated to about a 7% increase in specific thrust.